LCA Activities in New Zealand

LCA Workshop/Roundtable, Rotorua, Forest Research, NZ, February 2005

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Although Life Cycle Assessment has been applied for a number of projects in New Zealand over the last years, with some involvement in the ISO process, e.g. from Forest Research, communication between LCA practitioners did not really get started. There have been project-related workshops on LCA before, however, this was the first general LCA workshop where all interested LCA practitioners came together to discuss potentials for joined activities and generic problems of datae in New Zealand, as well as to identify possibilities of building up a database and exchanging information.

LCA practitioners from research organizations, universities and consultancies presented overviews on current projects, and a representative from the Ministry for the Environment initiated a discussion on the needs of LCA in New Zealand. As a result, a workshop on developing a database with generic LCA datae for New Zealand is planned (for further information, please contact Dr. Barbara Nebel <barbara.nebel@scionreserach.com>).

The scope of the studies ranged from detailed inventories to full LCA studies, including impact assessment. A strong focus was put on building materials, while wood products, forestry, energy, waste treatment, horticultural and agricultural studies were covered as well. Goals of the studies ranged from providing background datae for further studies, up to using the results for policy making and product design.

Timothy Allan (Locus Research) talked about his experiences in using LCA for sustainable product design and presented a case study on the design of hospital curtains. This project investigated the use of LCA as a tool to model conceptual product life cycles. The subject was the hospital bed screen and the object was to build a range of alternative product life cycles and assess them at a screening level to evaluate the sustainability of the designs. Two of them are the predominant types employed today in hospitals. The project was conducted for the British Environment Partnership and was collaboratively undertaken with Neil Tierney from Light Weight Medical UK Ltd. This project demonstrated the value of designing a 'Life Cycle'; rather than the product itself, and created a different emphasis for the design team.

Laurence Dolan presented results of a comparative LCA on the disposal of farm plastics (Dolan 2004). The study covers five options (status quo; on-farm burial by all farmers; on-farm burning by all farmers; drop-off at collection facility for recycling; drop-off at a transfer station for landfill disposal; drop-off at a transfer station for incineration with energy recovery) for the management of the two predominant types of waste farm plastics (HDPE chemical containers and LDPE film). The functional unit was defined as 'The collection and treatment/disposal of waste farm plastics generated within a region over the period of one year.' The results indicate that recycling into products, as a replacement for virgin plastic, will have the least negative effect on the environment, when compared to other scenarios and the present situation (a combination of these scenarios). The recycling scenario includes the transport of the plastic material by the farmer to a transfer station for recycling.

The work presented by Andrew Alcorn (Victoria University Wellington) also focused on embodied energy and CO_2 emissions of building products from an architecture angle: Whole buildings are analyzed in a Zero- and Low-Energy House project undertaken with BRANZ, which reveals some surprisingly high impacts from unexpected sources, such as paint. CO_2 coefficients are based on the energy input to each of the building materials.

Tessa Mills (HortResearch) gave an overview of a current LCA project on vineyards at HortResearch. The functional unit is 1000 L of unfermented grape juice, and the boundary of the study is the vineyard gate. Water use and green waste from prunings were identified as key areas where efficiencies can be increased. Therefore, the LCA includes also scenarios of using grape prunings as mulch. The potential effects from using mulch on vineyard-water use, on the mobility of applied pesticides with regard to leaching through the soil profile, and on the overall soil quality with regard to increased soil organic matter content will be analysed. Another key issue concerning the production of grape juice is the use of treated timber poles. The poles are treated with CCA (copper, chrome and arsenate). Difficulties for the LCA concern the quantification of the amount of leaching from these poles and the fate of the leachate.

Per Nielsen and Barbara Nebel (both from Scion, formerly 'Forest Research') gave an overview of the LCA activities at Scion, which cover a range of LCA studies on timber and plantation forestry. A study on pine plantations, based on the functional unit of 1 m^3 roundwood logs, built up on an

earlier study from Gifford et al. (1998). The scope of the study includes nursery, forest establishment, forest management and harvest of the timber. The inventory analysis shows that fuel is the greatest input in terms of mass, and that most fuel is used in the harvesting phase. Travel distance is one of the parameters which has a strong correlation to the total fuel consumption. Efficient organization of travel to the workplace can therefore influence the overall results. Regional differences within New Zealand were analyzed as well. The results indicate that the differences depend on external factors, e.g. the yearly afforestation rate, rather than on actual differences between the regions, such as contour.

Another study which recently has been completed at Scion is a comparison of home heating by using electricity, natural gas and a wood pellet burner. In over two thirds of the dwellings, electricity is used for space and water heating. In around 50% of residential buildings, wood is currently used for heating, mainly in addition to electric heating. The trend for both – electricity and wood – is slowly declining in favor of gas, due to the demand for convenient and clean fuels. Wood pellets are a convenient and sustainable alternative. Comparing heat provided from wood pellets, electricity and natural gas has shown that natural gas is the most environmental benign option in most impact categories. However, the shortage of this resource has to be taken into account. Wood pellets contribute the least to global warming potential and abiotic resource depletion, but have a comparatively high impact on ozone depletion, due to the diesel consumption during their life cycle.

Literature

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